

What is claimed is:

1. A method for oxidizing a layer in a semiconductor stack, comprising:

forming a first mirror;

forming an active region on the first mirror;

forming an oxidizable layer on the active region;

forming a second mirror on the oxidizable layer;

diffusing an oxidizing agent into the oxidizable layer;

oxidizing the oxidizable layer laterally to a distance only so as to result in an aperture of an unoxidized area in the oxidizable layer; and

wherein the oxidizing agent is a fluid comprising oxygen.

2. The method of claim 1, further comprising heating the oxidizable layer.

3. The method of claim 2, wherein at least a portion of a perimeter of the oxidizable layer is exposed for the diffusing of an oxidizing agent into the oxidizable layer.

4. The method of claim 2, wherein the second mirror has at least one trench from an external surface of the second mirror to the oxidizable layer for the diffusing of an oxidizing agent into the oxidizable layer.

5. The method of claim 3, wherein the semiconductor stack is InP based.

6. The method of claim 4, wherein the semiconductor stack is an InP based VCSEL.

7. The method of claim 5, wherein the oxidizable layer comprise InAlAs.

8. The method of claim 6, wherein the oxidizable layer comprises InAlAs.

9. A semiconductor device comprising:

a first mirror;

an active layer situated on said first mirror;

an oxidizable layer situated on said active layer;

a second mirror situated on said oxidizable layer; and
wherein said oxidizable layer comprises a material with oxygen.

10. The device of claim 9, wherein said first mirror has at least one trench from an outside surface of said first mirror into said oxidizable layer.

11. The device of claim 10, wherein:
a fluid having oxygen is conveyed into the at least one trench to oxidize a first portion of said oxidizable layer; and
a second portion of said oxidizable layer is an aperture.

12. The device of claim 11, wherein the aperture is for guiding current.

13. The device of claim 12, wherein the semiconductor device is an InP based VCSEL.

14. The device of claim 13, wherein said oxidizable layer comprises InAlAs.

15. A semiconductor device comprising:

a first reflector stack;

an active region situated on said first reflector stack;

a second reflector stack situated on said active region; and

wherein said second reflector stack comprises at least one layer having a first portion oxidized with an oxidizing agent having a fluid with oxygen.

16. The device of claim 15, wherein the first oxidized portion of the at least one layer forms a perimeter around an aperture.

17. The device of claim 16, wherein the aperture is for guiding current.

18. A method for oxidation comprising;

providing a structure having a layer with an oxidizable material; and

wherein:

the layer has a fluid in a portion of the layer
to be oxidized;
the fluid contains an oxidizing agent; and
the portion of the layer to be oxidized is
oxidized with an increase of temperature of
the layer.

19. The method of claim 18, wherein the layer may be
laterally oxidized with diffusion of an oxidizing
agent into the layer.

20. A method for oxidation comprising:
providing a structure having a layer containing
an oxidizable material;
placing the structure in an environment having a
water vapor;
adding oxygen to the environment; and
heating the environment to oxidize the layer to a
planned extent.